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Indiana State Department of Health Guidelines for Methicillin-Resistant *Staphylococcus aureus* (MRSA) in Indiana Schools

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Methicillin-Resistant *Staphylococcus aureus (MRSA)* Overview

John F. Kennedy once said, "Change is the law of life." This is true of many bacteria, including *Staphylococcus aureus*. *S. aureus* has changed over the years, becoming resistant to many antibiotics in order to survive. It usually causes mild skin infections, such as pimples, impetigo, rashes, or boils, but can cause more severe illness, such as bloodstream and bone infections and pneumonia. *S. aureus* commonly resides on the skin or in the nose of healthy people and does not cause infection. In the past, most serious *S. aureus* infections were treated with a certain type of antibiotic related to penicillin. Over the past 50 years, treatment of these infections has become more difficult because the bacteria have become resistant to various antibiotics, including the commonly used penicillin-related antibiotics. These resistant bacteria are called methicillin-resistant *S. aureus* (MRSA).

MRSA has historically been isolated from hospitalized and long-term care patients. Some patients have become colonized with the organism. MRSA has been associated with intensive care units (ICU) and in persons with chronic illnesses who have taken multiple antibiotics. MRSA associated with these hospitalized and long-term care patients has been resistant to most of the available antibiotics and is very difficult to treat.

Since 2000, the number of healthy adults and children with MRSA infections has steadily increased. Many of these people have had skin infections, such as pustules and boils. The MRSA isolated from these otherwise healthy people is different from the MRSA traditionally isolated from very ill individuals. MRSA isolated from healthy adults and children is susceptible to more of the currently available antibiotics than MRSA found in the very ill; thus, there are more treatment options available.

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MRSA: Infection and Colonization

Colonization is the presence of the bacteria on a person's body without observable clinical symptoms. When this bacterium is isolated from a healthy individual, the person is said to be colonized. It is estimated that 25-30% of the United States population is colonized with *S. aureus* at any given time. The number of MRSA colonized people at any one time is not known. When a person is colonized, bacteria live on the skin but cause no harm.

Infection refers to the invasion of the bacteria into tissue with growth of the organism. Infection may occur when the bacteria enter a break in the skin. MRSA infection is characterized by a laboratory test positive for MRSA accompanied by clinical signs of illness, such as fever, elevated white blood count, and inflammation.

Healthy people are generally at low risk for developing MRSA infection. People with compromised immune systems, which may include some patients with the human immunodeficiency virus (HIV), may be at risk for more severe illness if they get infected with MRSA.

How is MRSA spread?

MRSA is spread among people who have close contact with people who harbor the organism. Both colonized and infected patients are major reservoirs of the bacteria, but when a person is infected, it is more likely that the organism could be transmitted to others. MRSA is almost always spread by direct physical contact and not through the air. Transmission of MRSA may also occur through indirect contact by touching objects, such as towels, clothes, bandages, or sports equipment contaminated by the infected skin of a person with the bacteria.

In 2003, an outbreak of MRSA occurred among a football team in Indiana. MRSA was isolated from the skin infections of players. A study was conducted to determine if anyone else associated with the team was colonized with MRSA in the nose. It is interesting to note three individuals had nasal carriage with MRSA. Additional microbiology testing showed that those nasal carriers all had distinct strains of MRSA that were different than the outbreak strain. Everyone who was ill was infected with the same outbreak strain. The colonized people were not spreading MRSA.

MRSA Colonized Students in the Classroom

Children colonized with MRSA should not be excluded from the classroom. The reasons for this recommendation include:

- Since the prevalence of MRSA is increasing in the community, it is likely that there are colonized students in the classroom who are not aware that they harbor the organism. Thus, excluding a child known to be colonized with MRSA would be relatively ineffective in reducing the risk of MRSA infection to classmates.
- The risk for acquisition of MRSA in the school setting by children, including those who are medically or developmentally challenged, is no greater than the risk of contracting a skin infection caused by other pathogens.

The overall risk of infection from MRSA in the school setting will not be appreciably increased when children who are colonized with MRSA are admitted. The risk will not be appreciably decreased when colonized children are excluded. However, exclusion will adversely affect the colonization children by depriving them of an education, without benefiting the children already present in the setting.

Skin Infections in the Classroom, Including MRSA

Any infection or draining wound could pose a threat to others. When a student with a MRSA infection is in the classroom, certain infection control measures should be in place. These measures include, but may not be limited to:

- Keep infections, particularly those that produce pus or drainage, covered with clean, dry bandages. The student should follow the healthcare provider's instructions on proper care of the wound. Pus from infected wounds can contain bacteria, including MRSA, and spread the bacteria to others. Bandages should be disposed in a manner such that others would not have contact with the drainage (e.g., in a closed baggie).
- Advise those who may have contact with the infected wound to wash their hands thoroughly with soap and warm water. Persons who expect to have contact with the infected wound should wear disposable gloves, and wash their hands after removing the gloves. Hand washing is the single most important measure to prevent MRSA transmission.
- Avoid sharing personal items (e.g., towels, washcloths, clothing) that may have come in contact with the infected wound. Wash soiled linens and clothes with hot water and laundry detergent. Drying clothes in a hot dryer, rather than air-drying, also helps kill bacteria.
- Clean potentially contaminated surfaces carefully with a disinfectant or a bleach-water solution (1:100 dilution of sodium hypochlorite, which is approximately ¼ cup of 5.25% household chlorine bleach to 1 gallon of water) after caring for the wound.

Schools should continue to provide general cleaning on a regular schedule. Students who are infected with MRSA should follow the healthcare provider's treatment plan, including completion of any antibiotics prescribed.

MRSA in Athletics

Transmission of MRSA among sports participants is a concern. Possible risk factors for infection include close physical contact, skin damage, and sharing of equipment or clothing. The risk for transmission of MRSA is much greater among sports participants than among students in a classroom. The U.S. Centers for Disease Control and Prevention (CDC) has published the following guidance for preventing staphylococcal skin infections in the sports setting:

- Cover all wounds. If a wound cannot be covered adequately, consider excluding players with potentially infectious skin lesions from practice or competitions until the lesions are healed or can be covered adequately.
- Encourage good hygiene, including showering and washing with soap after all practices and competitions.
- Ensure availability of adequate soap and hot water.
- Discourage sharing of towels and personal items, such as clothing or equipment.
- Establish routine cleaning schedules for shared equipment, including mats.
- Train athletes and coaches in first aid for wounds and recognition of wounds that are potentially infected.
- Encourage athletes to report skin lesions to coaches and encourage coaches to assess athletes regularly for skin infections.

Development of Policies

Indiana schools may consider developing policies related to MRSA-infected students and related to prevention of skin infections in individuals participating in sports. School wrestling programs may wish to review guidance provided by the National Federation of State High School Associations when developing school policies related to skin infections. Frequent hand washing should always be encouraged.

Indiana State Department of Health Contact

The Indiana State Department of Health is available for consultation. If you have questions or concerns, please contact Julia Butwin, MSN, RN at 317/233-7825, or via e-mail at jbutwin@isdh.state.in.us.

Additional Reading:

Chamber F. The Changing Epidemiology of *S. aureus*. Emerging Infectious Diseases. 2001; 7 (2)
http://www.cdc.gov/ncidod/eid/vol7no2/chambers.htm

Community-Associated MRSA: Frequently Asked Questions
Centers for Disease Control and Prevention
http://www.cdc.gov/ncidod/hip/Aresist/mrsa_comm_faq.htm

Methicillin-Resistant *Staphylococcus aureus* Infections Among Competitive Sports Participants --- Colorado, Indiana, Pennsylvania, and Los Angeles County, 2000-2003
Centers for Disease Control and Prevention
Morbidity and Mortality Weekly Report 2003, 52 (33); 793-795
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5233a4.htm

American Academy of Pediatrics. Staphylococcal Infections. In: Pickering LK ed. Red Book: 2003 Report of the Committee on Infectious Disease. 26th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2003: 561-572

Information on Staphylococcal Infections School Athletic Departments: Instructions for Athletes.
Texas Department of Health
http://www.tdh.state.tx.us/ideas/antibiotic_resistance/mrsa/school_athletic_athletes.asp

Physician Release for Wrestlers to Participate with Skin Lesions
National Federation of State High School Associations
http://www.nfhs.org/staticcontent/pdfs/wrestling_physician_form03.pdf

Skin Infections in Contact Sports
Utah Department of Health
http://health.utah.gov/els/skininfect/

Methicillin-Resistant *Staphylococcus Aureus* (MRSA) in Correctional Settings

By Dr. Dean Rieger, Medical Director
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***Staphylococcus aureus* (SA)** is commonly found on the skin and in the anterior nares (nostrils). Although SA usually colonizes humans without causing disease, it does cause infections that can be minor or serious and involve almost any organ in the body. SA is easily spread by direct or indirect contact with the products of infection and even by contact with the skin of a colonized person.

In county jails, people live in close contact and often have less than exemplary personal hygiene habits. Because of the close living conditions and the high client turnover, furnishings and linens may be shared without having been cleaned well enough to kill SA that may be present. It is not surprising that county jails are settings in which SA outbreaks are common.

SA skin infections typically begin as small erythematous patches, usually in a follicular pattern or in small breaks in the skin, and progress to become tiny pustules. The exudates in these pustules, if cultured, will grow SA. The infection may progress to one or more abscesses, may spread locally, or may penetrate tissue and become systemic.

In addition to a varying sensitivity to antimicrobials, SA exhibits virulence that varies broadly. Most SA is not especially virulent and lives commensally on the skin, only causing infection in an opportunistic but non-aggressive manner. Some SA, however, is extremely virulent and can progress from a trivial skin infection to full blown sepsis in a matter of hours or days. Many factors affect this, some belonging to the host and others to SA itself. SA is famously known for its toxins, one of which causes toxic shock syndrome. When managing patients in a single facility, whether in response to endemic or outbreak presentations, the attending health care professionals must consider virulence when determining how aggressively to treat SA infections.

Methicillin resistance is an issue commonly addressed with SA. However, SA must be addressed whether or not the SA found in a facility exhibits resistance to methicillin. Methicillin resistance is a characteristic separate from virulence. Both resistance profiles and virulence must be considered when determining how a patient or an outbreak should be managed.

Methicillin resistant SA, or MRSA, first became common in hospital settings in the 1960s when methicillin was the antibiotic of last resort for treating SA infections. Within a few decades of the appearance of MRSA, in some hospitals, it had become the most common SA isolate. Vancomycin took over methicillin's role as the antibiotic of last resort and then, not surprisingly, vancomycin-resistant (VRSA) and vancomycin intermediate-resistant (VISA) strains began to appear. Currently, isolation of either VRSA or VISA is a rare event. During this same period, several other strains of SA independently developed resistance to methicillin. Three distinct strains of community-associated MRSA (CA-MRSA) have been identified, and these CA-MRSAs are notable because they retain sensitivity to one or more common antibiotics, including trimethoprim-sulfamethoxazole (Bactrim, Septra) and tetracyclines. Except for their antimicrobial sensitivities, none of the SA strains is clinically distinguishable from each other.

The information below is directed toward the prevention and management of CA-MRSA outbreaks and will not address individual treatment of patients with CA-MRSA infections beyond noting that the same considerations that have pertained to treatment of SA during the antibiotic era are still true. Trivial skin infections can usually be managed without antibiotics. More serious infections may require antibiotics, incision and drainage, inpatient care, and so on. Standard antibiotic therapy may be augmented with rifampin, but rifampin must not be used as monotherapy because of the simplicity and speed with which resistance develops.

CA-MRSA should be considered endemic in jail settings, and sporadic cases should be expected. When CA-MRSA infections occur more than occasionally, prevention and management of CA-MRSA outbreaks require recognition and understanding of the CA-MRSA problem, treatment of cases that are likely sources of transmission; and, perhaps most importantly, attention to the environment.

It may seem obvious to emphasize the importance of the recognition of an outbreak, but in many jails, outbreaks have continued for long periods without either the jail operations staff or health services personnel realizing it. Jails are short-stay facilities, and it is not uncommon for an inmate with a skin infection to leave jail without ever mentioning the infection to jail personnel. The typical presentation of CA-MRSA in jails -- single or multiple reddish spots on the lower extremities -- has often been misinterpreted as an epidemic of spider bites. Not surprisingly, attempts at spider and insect control fail to terminate the outbreak. Until the skin infections are recognized as likely SA infections, the outbreak is likely to go unrecognized.

Once an outbreak is suspected, only culture with determination of the antimicrobial sensitivity pattern will permit a reliable diagnosis of SA or CA-MRSA. (Theoretically, an outbreak can be caused by hospital-acquired MRSA, or even VISA/VRSA. If a jail facility has VISA/VRSA, expert consultation should be sought from the health department.) Once the outbreak is recognized and the antibiotic sensitivity pattern established, it is not necessary to culture every patient, although those with aggressive infections or weakened immunity should be cultured. Empirical treatment is generally reasonable, even for those who require oral antibiotics.

Some practitioners feel that it is appropriate to try to eradicate not only infection, but also colonization. This is a well-intentioned but misguided approach to outbreak management. Treatment with antimicrobials applies a strong (albeit brief) selection pressure and can encourage the development of a strain that is either relatively or completely resistant to the antimicrobial in use, and viable bacteria shed during the initial treatment are more likely to be resistant than they would be otherwise. Shedding organisms with intermediate resistance is likely both from colonized and infected patients. Eradication of colonization is reasonable when an individual patient has repeatedly failed treatment for CA-MRSA, or when there are specific host factors that make any CA-MRSA infection especially dangerous. Eradication of carriage in the nares, when necessary, can be accomplished with mupirocin calcium 2% ointment (Bactroban).

For prevention or termination of an outbreak, it is important to understand how SA survives in the environment and how it is transmitted. This understanding is critical to determining how transmission can be interrupted and how an outbreak can be terminated. SA thrives in warm and moist environments. As it dries out, it dies. The key to reducing transmission between prisoners is reducing the bacterial load in the environment and interrupting potential contacts between prisoners and bacteria.

- Inspect the facility to make sure that obvious opportunities for contact are interrupted. Eliminate shared towels in bathrooms, kitchens, laundry areas, workshops, or other locations.
- Implement terminal disinfection procedures when one prisoner leaves a housing area and another enters it. Clean the fixtures, the mattresses, the furniture, and so on. Discard objects that cannot be disinfected properly.
- Make sure that all cleaning solutions are properly bactericidal. This usually means that products containing quaternary ammonium compounds should be used, taking care to dilute in accordance with the manufacturer's recommendations. Solutions that are too dilute will often make the surface visually clean but will fail both to kill bacteria on contact and to leave a killing residuum.
- Review practices in recreation areas, such as weight rooms. Health clubs provide spray bottles of antimicrobial solutions for use in cleaning weight machines between users and so should jails.
- Review practices in booking areas. Simple plastic benches, for example, can become vectors for transmission. Frequent cleaning with solutions that leave a killing film can help stop this.
- Bathrooms should be cleaned regularly, using appropriately bactericidal products. Toilet seats should receive the same treatment between users as weight machines.

- Laundry facilities should be reviewed and inspected. Is the detergent bactericidal? Do the washer and/or dryer reach proper killing temperatures? Is laundry dried or brought out still cool and moist? Commercial laundries periodically test their processes to make sure that bacteria are killed and so should jails.
- Identified CA-MRSA patients, especially those with draining wounds, can produce huge quantities of bacteria and deposit them in the environment. Patients with draining wounds should be required to control their secretions. If they cannot or if they refuse to, separation from the general population or even formal isolation may be appropriate.
- The two primary populations of the jail, prisoners and personnel, should be educated regarding CA-MRSA. They need to understand both how to protect themselves from transmission and how to recognize a SA infection. Early intervention for those infected is vital for decreasing the environmental load of SA bacteria.
- Personal hygiene, most importantly frequent hand washing, is critical for interrupting transmission. This applies not only to the prisoners but also to health services employees.
- Eliminating barriers to health care access is important. Co-pay requirements are an important tool for controlling unnecessary or abusive health services requests, but to the extent that they stop infected prisoners from seeking health services, they may prolong an outbreak.

It is not possible to anticipate every means through which CA-MRSA can be transmitted nor every corrective or preventive measure that can help stop an outbreak or prevent an outbreak from occurring. That is why those working with the county jails must understand the nature of SA and its transmission and individualize their approaches.

Just as it is critical to identify an outbreak when it occurs, it is similarly important to monitor outbreaks so that the administrative staff can determine whether or not control measures are effective. Outbreaks cannot be managed through impressions and memories. Cases should be documented and logged, and at least minimal descriptions should be maintained for each case. This will permit the facility staff not only to determine if an outbreak is getting worse, staying the same, or disappearing, but will also provide evidence upon which the local CA-MRSA strain's virulence can be gauged.

These approaches have been used in short- and long-term facilities with success. They work. Outbreaks have been terminated within a month of identification and initiation of proper environmental sanitation. Facilities would be well advised to review their practices in advance of identifying any outbreaks, as environmental measures can prevent outbreaks from occurring.

Eliminating the occurrence of CA-MRSA in jails is impossible. CA-MRSA is now widespread in the community at large, and even if it were eliminated from any single county jail, it would very likely be reintroduced within a few days. When the human immunodeficiency virus was first identified and discovered to be more prevalent in jails than in other settings, jail personnel entered a period of near panic, afraid of infection. With time and the establishment and acceptance of universal precautions, jail personnel learned that, with proper care, the risk of becoming infected could be reduced nearly to zero. CA-MRSA engenders the same type of fear. SA has done this before with toxic shock syndrome. Like these earlier SA panics, CA-MRSA will become something that we understand and live with. The key tools remain: understanding how the bacteria survive and spread, and how we can interrupt that process.

CA-MRSA outbreaks in correctional settings should be reported to the local health department or to the Indiana State Department of Health, Epidemiology Resource Center, at 317/233-7125.

Increased Incidence of Invasive Group A Streptococcal Infection In Indiana

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Invasive Group A *Streptococcus* infection (GAS) occurs when GAS, bacteria commonly found in the throat, invade other parts of the body, including blood and tissue. People with GAS will not automatically develop invasive infection. Invasive GAS infection usually develops when a person has a weakened immune system caused by other medical conditions or when the bacteria enter the bodies of otherwise healthy people, such as an opening in the skin can allow entry into deeper tissue.

Some strains of GAS may cause invasive disease in otherwise healthy individuals. In rare instances, these bacteria can cause severe and even life-threatening invasive disease, such as necrotizing fasciitis (NF), streptococcal toxic shock syndrome (STSS), bacteremia, and pneumonia. According to the Centers for Disease Control and Prevention (CDC), approximately 9,000 cases of invasive disease (3.2/100,000 population) occurred nationally in 2002. STSS and NF each accounted for approximately 6% of cases. Over 10 million noninvasive GAS infections (primarily throat and skin infections) occur annually in the U.S.

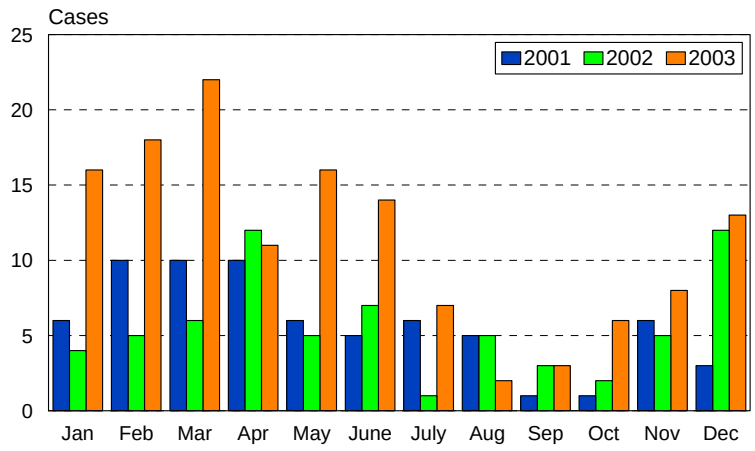
Incidence of Invasive GAS in Indiana

The number of cases of invasive GAS varies annually. As of October 2000, the Indiana State Department of Health requires physicians, hospitals, and laboratories to report Group A *Streptococcus* (*Streptococcus pyogenes)* invasive disease. This change in the reporting rule may have influenced the number of reported cases initially, however, little difference was observed when comparing 2001 and 2002 data.

In 2001, 69 cases were reported, and in 2002, 67 cases were reported, for an incidence rate of 1.09 cases per 100,000 population. In 2003, there was a sharp increase in cases: 136 cases were reported, for an incidence rate of 2.21. Though the incidence rate has doubled in Indiana, it remains below the national rate of 3.2 cases per 100,000 in 2002. No significant difference was noted in incidence in regard to gender. In 2003, blacks had a higher incidence than whites, 1.71 to 2.67 per 100,000, respectively. In 2003, the highest incidence rates were found in individuals under age 1 (7.05/100,000), those ages 70-79 (7.52/100,000), and those ages 80 and over (8.07/100,000).

Incidence of Reported Cases of Invasive GAS by Age Group in Indiana in 2003

Age Group	Number of Cases	Incidence Rate
<1	6	7.05
1-4	3	0.87
5-9	10	2.28
10-19	4	0.44
20-29	9	1.06
30-39	9	1.02
40-49	19	2.02
50-59	12	1.67
60-69	20	4.44
70-79	26	7.52
80+	17	8.07



How GAS Is Spread

- GAS is spread through direct contact with drainage from the nose or throat of an infected person or with infected wounds or sores on the skin.
- GAS is frequently seen in school-age children when school is in session. An environment which promotes transmission would be a large number of yelling, coughing, sneezing children in an enclosed area sharing food and drinks.
- People who carry the bacteria but have no symptoms are much less contagious.
- It is not likely that household items like plates, cups, or toys spread these bacteria.

Common Strep Illnesses

- **"Strep throat"**, the most common illness caused by GAS, is easily treated with a 10-day course of conventional antibiotics, usually penicillin. If left untreated or partially treated, however, it can be followed by rheumatic fever, which may result in permanent damage to the heart valves. Rheumatic fever, currently a rare disease, may occur when patients do not complete a full course of antibiotics to treat strep throat.
- **Impetigo** is the second most frequently occurring infection caused by GAS. This is a mild skin infection accompanied by open, draining sores. Complications are rare. It is easily treated with common antibiotics.
- **Scarlet Fever** is characterized by a fever, sore throat, red sandpaper-like rash, and a red "strawberry" tongue. It is caused by several different strains of streptococcal bacteria, all of which produce a toxin that causes the characteristic red rash. It is treated in the same manner as strep throat.

Invasive Infections

GAS comprises a number of strains of bacteria that can produce a wide range of illnesses. Some, like "strep throat" and impetigo, are quite common and easily treated. Others, including those referred to as invasive disease, are more rare and require immediate medical attention. Certain strains of Group A bacterium can lead to several forms of invasive disease, including pneumonia, meningitis, infection of the bone, and an illness resembling toxic shock syndrome.

Necrotizing Fasciitis

Necrotizing fasciitis is the medical term for a serious skin and muscle infection caused by certain strains of GAS. These bacteria can destroy tissue. Though it occurs in less than 10 percent of the persons who develop an invasive GAS infection, it can be fatal in 20% to 30% of these cases. Not everyone infected with this bacterium will become ill, although the reason for this is unknown. Because of the amount of tissue damage seen with this kind of infection, physicians at times will use multiple antibiotics along with the surgical removal of severely damaged skin and muscle tissue.

Diagnosis

Healthcare providers are unable to say with certainty that a person has GAS without additional laboratory testing. Noninvasive procedures can be done in the office to test for GAS. A swab is used to collect fluids from the back of the throat or skin for such tests. One test can offer results within minutes and the other takes a couple of days.

- The rapid antigen test takes only 15-30 minutes. If the test is positive for GAS, the diagnosis is confirmed; however, a negative test does not always mean a person does not have GAS infection. Rapid tests have an error rate of about 10-20%.
- If the rapid test is negative, a culture is sent to the lab for further testing. Results are usually obtained in 48-72 hours, and the diagnosis confirmed if GAS is found.

Treatment

- GAS bacteria are known to be sensitive to penicillin, so it is the preferred antibiotic for most types of streptococcal infections.
- Necrotizing fasciitis is more effectively treated with penicillin in combination with clindamycin, or another antibiotic, and surgery.
- Treating infected persons with an antibiotic for 24 hours or longer generally eliminates their ability to spread the bacteria.
- It is important to complete the full course of antibiotics as prescribed.

Prevention of GAS Infection

The spread of all types of GAS infections may be reduced by:

- Completing the course of antibiotics as prescribed
- Covering one’s mouth and nose when coughing or sneezing
- Washing hands after coughing or sneezing
- Washing hands before preparing foods and before eating
- Avoiding the sharing of food or drinks

- Persons with sore throats should be seen by a doctor who can perform tests to determine whether the illness is caused by "strep throat". If test results are positive, the person should stay home from work, school, or day care for at least 24 hours after beginning antibiotic treatment.
- Cleaning and covering wounds.
- If a person has an infection (redness or inflammation around a wound) in which the reddened area becomes progressively larger, he/she should see a healthcare provider as soon as possible.

For more information on invasive GAS disease, contact your local health department or call the Indiana State Department of Health at 317-234-2804.

Additional Reading

***Streptococcus pyogenes emm* Sequence Database**
http://www.cdc.gov/ncidod/biotech/strep/strepindex.htm

NIH Information
http://www.niaid.nih.gov/factsheets/strep.htm
http://www.cdc.gov/ncidod/EID/vol1no3/stevens.htm

Healthcare Provider Information
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/groupastreptococcal_t.htm
http://aepo-xdv-www.epo.cdc.gov/wonder/prevguid/tp_00863.htm - Prevention Guidelines for Streptococcal Infections (also includes Group A and Group B streptococcal infections)
http://www.cdc.gov/ncidod/EID/vol1no3/stevens.htm - Streptococcal Toxic-Shock Syndrome: Spectrum of Disease, Pathogenesis, and New Concepts in Treatment, 9/95
http://wonder.cdc.gov/wonder/prevguid/p0000446/entire.htm - Guideline for Infection Control in Hospital Personnel, 7/83

Media Information
http://www.bcm.tmc.edu/oto/grand/123192.html - Necrotizing fasciitis of the head and neck - Case study for teaching purposes - Baylor College of Medicine/Houston, TX
http://www.cdc.gov/ncidod/EID/vol2no1/strepyro.htm - Trends in Bacteremic Infection Due to Streptococcus pyogenes (Group A Streptococcus), 1986-1995, 3/96
http://www.cdc.gov/ncidod/hip/abc/facts39.htm - CDC's "The ABCs of Safe and Healthy Child Care" - information on strep throat and scarlet fever

Laboratory Information
http://www.cdc.gov/ncidod/EID/vol5no2/hoe.htm - Rapid Molecular Genetic Subtyping of Serotype M1 Group A Streptococcus Strains, 4/99
http://www.socgenmicrobiol.org.uk/MIC/146/1195/1461195A.PDF emm and sof gene sequence variation in relation to serological typing of opacity-factor-positive group A streptococci

Outbreak Information
http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/00049535.htm - MMWR Outbreak of Invasive Group A Streptococcus Associated with Varicella in a Childcare Center -- Boston, Massachusetts, 1997 2.
http://www.cdc.gov/nchstp/tb/pubs/mmwr/mm4718.pdf - Varicella related deaths among children - United States - 1997, 5/98

http://www.cdc.gov/ncidod/EID/vol2no1/strepyro.htm - Trends in Bacteremic Infection Due to Streptococcus pyogenes (Group A Streptococcus), 1986-1995, 3/96

http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/00056612.htm - March 05, 1999 / 48(08);163-166. Nosocomial Group A Streptococcal Infections Associated with Asymptomatic Health-Care Workers -- Maryland and California, 1997

OUTBREAK SPOTLIGHT….

Outbreak Spotlight is a regularly occurring feature in the *Indiana Epidemiology Newsletter*. The event described below highlights the collaboration of different local health departments investigating an outbreak that crosses county and district borders.

A Joint Effort
Outbreak of Gastroenteritis in Jackson County

By Robert Allen, MPA
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Districts 7 and 8

Background

On April 12, 2004, a representative of the Jackson County Health Department notified the Indiana State Department of Health (ISDH) that several students and staff members from a Jennings County school had developed symptoms of gastroenteritis, characterized primarily by vomiting and diarrhea, after eating lunch at a Jackson County restaurant on April 12. Approximately 23 students and school staff ate at the restaurant.

Epidemiologic Investigation

The ISDH, the Jackson County Health Department, and the Jennings County Health Department initiated a collaborative investigation. A study was conducted in order to describe the outbreak and to determine whether the source may have been food-related. The ISDH developed a questionnaire that documented illness history and foods eaten at the restaurant. Since those affected were residents of Jennings County, the Jennings County Health Department distributed the questionnaire to the school group members who ate lunch at the restaurant. Completed questionnaires were returned to the Jennings County Health Department and forwarded to the ISDH Epidemiology Resource Center for analysis. A case was defined as any previously healthy person attending the lunch who became ill with diarrhea and/or vomiting on or after April 12. Anyone who attended the lunch and was well before and after April 12 was included as a control. Any person who was ill for any reason during the week before April 12, or who became ill with symptoms that did not include diarrhea and/or vomiting, was excluded from the study.

Twenty-three people attended the lunch, with 19 of the attendees reporting that they became ill. Thirteen people met the case definition. Four people were identified as controls. Symptoms reported by the 13 cases included: vomiting (85%), cramps (85%), nausea (69%), headache (69%), and fatigue (61%). Other symptoms reported included diarrhea, body aches and chills. The median duration of illness was 19 hours (range: 2.0 hours to 36.0 hours). None of the cases sought medical attention. No stool specimens were available for laboratory analysis. The median incubation period of illness was 1.5 hours (range: 0.50 hours to 2.5 hours).

School group members all atefrom a lunch buffet and did not order from the menu. They arrived at the restaurant at 11:50 a.m. and left at approximately 1:15 p.m. According to the restaurant manager, over 100 meals were served during lunch. Other than the school group, no other patrons reported illness to the local health departments or to the restaurant.

Due to the limited number of controls, statistical analysis could not be performed. Many of the individuals stated that the ice cream tasted unusual; however, there was no conclusive evidence that ice cream was associated with illness.

Environmental Assessment

Since the restaurant in question was located in Jackson County, representatives from the Jackson County Health Department inspected the restaurant on April 12 to review food preparation practices, collect leftover samples, and inquire about employee illness. Lunch buffet food samples were not available. However, several food samples from the evening buffet were available (see "Laboratory Analysis"). None of the employees reported having been ill. No employee had open cuts or wounds, although one line cook had a burn on the top side of the arm in the elbow area.

Temperatures of several products on the buffet were checked. Cucumbers measured 55°F, seafood salad 58°F, stuffed mushrooms 118°F, chicken on a stick 124°F, chicken and broccoli 123°F, chicken wings 118°F, roasted chicken 130°F, spicy chicken 102°F, and rice 158°F. Water in the steam units measured 200°F. According to the Indiana Retail Food Establishment Sanitation Requirements, Section 173, hot foods must be maintained at 140°F or above and cold foods at 41°F or below.

The ice cream dispenser is taken apart every night and washed in the dish machine. The ice cream mix is a non-dairy product mixed with cold water. Soft drink machines have aluminum fittings. Temperatures in the walk-in refrigerators measured 28°F and 25°F, and the freezer temperature measured -7°F.

Laboratory Results

No stool specimens were available for laboratory analysis. Several food samples were submitted to the ISDH Laboratories for analysis. The sample of ice cream had a slightly elevated aerobic plate count and coliform count, but tested within normal limits for *E. coli*, *Staphylococcus aureus*, and *Bacillus cereus*. Other samples tested within normal limits.

Conclusions

This investigation confirms that an outbreak of gastroenteritis occurred following a lunch outing at a Jackson County restaurant. Given that the only timely common factor among all ill individuals was eating lunch at the restaurant, transmission most likely occurred at this establishment. The individuals did not share any other common food items, nor was there a similar illness circulating in the school or the community at the time.

In the absence of laboratory results, it is impossible to conclusively identify the causative agent of this outbreak. However, the clinical syndrome is most compatible with *Staphylococcus aureus*. The symptoms experienced (vomiting and nausea) and incubation period (median 1.5 hours) are typical of staphylococcal infection. No specific food vehicle responsible for disease transmission was identified. However, the ice cream sample did show slightly elevated aerobic plate and coliform counts, which may be attributed to mishandling. Although the ice cream tested negative for the presence of *Staphylococcus aureus* bacteria, it is not uncommon for bacteria to be unevenly distributed in food. Staphylococcal enterotoxin testing was not performed.

Staphylococci are usually introduced into food when a food handler touches the nose, mouth, an open sore, or used handkerchief or tissue and then prepares food with inadequately washed hands. Once present in the food, the organisms can multiply rapidly under optimal temperatures and produce a heat-stable enterotoxin, which is not inactivated by subsequent cooking. However, staphylococcal foodborne disease can be prevented if food is prepared and stored properly. The optimal temperature range for growth of *Staphylococcus aureus* is 68°F to 99°F. This temperature range is achieved if hot or cold foods reach room temperature prior to or during serving. The environmental assessment noted that hot foods on the buffet were not maintained at or above 140°F, and cold foods were not maintained at or below 41°F. Hot and cold foods should be maintained at proper temperatures and temperatures monitored if not immediately consumed.

In general, most outbreaks of *Staphylococcus aureus* can be prevented by strictly adhering to the following food safety practices:

1. Ensure that anyone who handles food uses good hand-washing practices.
2. Use gloves or utensils to handle food, rather than bare hands.
3. Maintain hot foods at 140°F or above; maintain cold foods at 41°F or below.
4. Regularly monitor food temperatures.

Training Room

Indiana State Department of Health
Immunization Program Presents:
"Child and Adolescent Immunizations from A to Z"

The ISDH Immunization Program and Health Educators are offering this free, one-day educational course on all aspects of immunization practices. Topics include:

- Principles of Vaccination
  - Overview of the immune system
  - Classification of vaccines
- An overview of Vaccine-Preventable Diseases
- General Recommendations on Immunization
  - Timing and spacing
  - Contraindications and precautions to vaccination
- Safe and Effective Vaccine Administration
  - Prior to administration
  - Administration
  - Documentation and reminder/recall
  - Adverse Events
- Safe Vaccine Storage and Handling
- Indiana Requirements
  - Schools
  - Day care/Head Start
  - Exemptions
- Tools to Read Immunization Records
- Vaccine Misconceptions
  - MMR and autism
  - Thimerosal and mercury
  - Overloading the immune system
  - Influenza vaccine
- Reliable Resources

This course is designed for all immunization providers and staff. Presentation of this course takes six hours or can be customized to provide the components needed for your office or clinic staff. A training manual and certificate of attendance are provided to all attendees.

Courses are held throughout Indiana about four times per month (see schedule next page). All persons involved in immunizations are encouraged to attend a course in their area. Registration is required. To attend or schedule/host a course in your area, or for more information on "Child and Adolescent Immunizations from A to Z" and other immunization education opportunities, please contact Beverly Sheets by calling (317) 501-5722, or email hepbbev@aol.com

CALENDAR 2004 "IMMUNIZATIONS FROM A TO Z"

***Don't forget:**

Indiana Immunization Program Fall Awards Conferences:
Monday, October 4, 2004 Marriott North Indianapolis and
Friday, October 8, 2004 at Primo Banquet and Conference Center, South Indianapolis.

Oct. 19, 2004 "Adult Immunizations" St. Vincent Office Associate Health Promotion, 8AM-12 Noon, Indianapolis (FULL)

Oct. 21, 2004 "Immunization A-Z", South Bend Memorial Hospital, 9AM-3 PM

Oct. 27, 2004 "Immunization A-Z", Porter County Health Dept., Valparaiso, 9AM-3PM

Nov. 10, 2004 "Immunization A-Z" Hamilton County 4 H Fairgrounds, 9AM-3 PM

Nov. 16, 2004 "Immunization A-Z", St. Francis College, Fort Wayne (FULL)

Dec. 1, 2004 "Immunization A-Z", IUMG, Indianapolis (FULL)

Dec. 3, 2004 "Immunization A-Z" ISDH Rice Auditorium, 9AM- 3PM

Dec. 9, 2004 "Immunization A-Z" Elkhart General Hospital, 9AM-3 PM

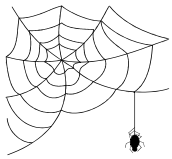
NOTE: There is no charge for any of these events.

NOTE: You must register for these events. Training materials are provided.

Contact Beverly Sheets at 317-501-5722 or hepbbev@aol.com for further information and to schedule "Immunizations From A –Z" and other immunization events in your area.

NOTE: There is NO CHARGE for any of these events.

YOU MUST REGISTER for these events. Training materials are provided.



Wonderful Wide Web Sites

ISDH Data Reports Available

The ISDH Epidemiology Resource Center has the following data reports and the Indiana Epidemiology Newsletter available on the ISDH Web Page:

http://www.statehealth.in.gov/dataandstats/epidem/epinews_index.htm

Indiana Cancer Incidence Report (1990, 95, 96, 97)

Indiana Cancer Mortality Report (1990-94, 1992-96)

Indiana Health Behavior Risk Factors (1995-96, 97, 98, 99, 2000, 2001, 2002)

Indiana Health Behavior Risk Factors (BRFSS) Newsletter

Indiana Hospital Consumer Guide (1996)

Public, Hospital Discharge Data (1999, 2000, 2001)

Indiana Maternal & Child Health Outcomes & Performance Measures (1988-97, 1989-98, 1990-99, 1991-2000)

Indiana Marriage Report (1995, 97, 98, 99, 2000)

Indiana Mortality Report (1999, 2000, 2001, 2002)

Indiana Natality Report (1995, 96, 97, 98, 99, 2000, 2001, 2002)

Indiana Induced Termination of Pregnancy Report (1998, 99, 2000)

Indiana Infectious Diseases Report (1997, 1998, 1999, 2000, 2001)

Former Indiana Report of Diseases of Public Health Interest (1996, 97, 98, 99)

HIV Disease Summary

Information as of August 31, 2004 (based on 2000 population of 6,080,485)

HIV - without AIDS to date:

327	New HIV cases from September 2003 thru August 2004	12-month incidence	5.38 cases/100,000
3,874	Total HIV-positive, alive and without AIDS on August 31, 2004	Point prevalence	63.72 cases/100,000

AIDS cases to date:

406	New AIDS cases from September 2003 thru August 2004	12-month incidence	6.68 cases/100,000
3,777	Total AIDS cases, alive on August 31, 2004	Point prevalence	62.12 cases/100,000
7,631	Total AIDS cases, cumulative (alive and dead)		

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in August *MMWR* Week 31-34		Cumulative Cases Reported January - August *MMWR* Weeks 1-34	
	2003	2004	2003	2004
Campylobacteriosis	94	50	311	224
Chlamydia	1,289	1,451	10,966	11,691
E. coli O157:H7	12	5	53	22
Hepatitis A	9	1	44	31
Hepatitis B	6	11	23	30
Invasive Drug Resistant *S. pneumoniae* (DRSP)	4	8	111	107
Invasive pneumococcal (less than 5 years of age)	2	6	34	32
Gonorrhea	513	597	4,156	4,165
Legionellosis	5	3	17	22
Lyme Disease	6	5	15	9
Meningococcal, invasive	3	2	34	16
Pertussis	4	8	37	63
Rocky Mountain Spotted Fever	0	0	1	4
Salmonellosis	73	45	364	279
Shigellosis	23	35	102	128
Syphilis (Primary and Secondary)	2	7	33	40
Tuberculosis	7	14	90	85
Animal Rabies	5 (bats)	2 (bats)	11 (bats)	7 (6 bats and 1 skunk)

For information on reporting of communicable diseases in Indiana, call the *ISDH Epidemiology Resource Center* at (317) 233-7665.

Indiana
Epidemiology
Newsletter

The *Indiana Epidemiology Newsletter* is published by the Indiana State Department of Health to provide epidemiologic information to Indiana health professionals and to the public health community.